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# LabLink

Michigan Department of Community Health
Bureau of Laboratories

"Quality Laboratory Science for Healthier People and Communities"

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## Updates from the Newborn Screening Program

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Newborn Screening Section

There have been several changes in newborn screening since the first meeting of the Michigan Department of Community Health Newborn Screening Quality Assurance committee in November 2006. Recommendations approved at that meeting were implemented starting in March 2007.

In addition to adding cystic fibrosis to the newborn screening test panel in October 2007, important efforts were put into place to improve the turn around time from sample collection to result reporting. This helps ensure that babies found with critical abnormal screening results can be referred for medical intervention at the very earliest, before irreversible damage or illness begin.

Testing specimens on Saturdays is a major program improvement. Overnight delivery has been arranged with Quest Diagnostics or United Parcel Service. Both services are pre-paid by the Newborn Screening Program. There were noticeable improvements in the time it takes for specimens to reach the laboratory before initiating Saturday testing. Saturday testing has contributed to an even faster turn around time.

More than 93% of Michigan babies are born in a hospital that now has arranged overnight specimen delivery**.** Those few who continue to use the U.S. Postal Service are urged to make this upgrade in delivery of specimens. Unfortunately, a small number of specimens are still arriving "late" (five or more days post birth), jeopardizing timely medical intervention. These parameters continue to be monitored as MDCH works with customers to improve this program.

Please call Carole Flevaris, Newborn Screening Follow-up Program Coordinator, (517) 335-8959, with any questions regarding arrangements for courier specimen delivery.

**LabLink** is published quarterly by the Michigan Department of Community Health, Bureau of Laboratories, to provide laboratory information to Michigan health professionals and the public health community.

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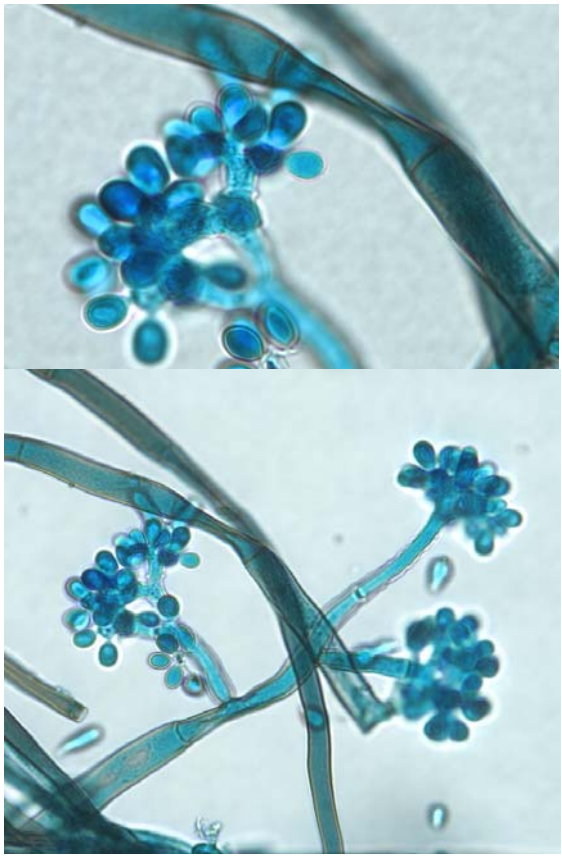
# *FUN FUNGI.....*
# *Botrytis* Species

Sandy Arduin MT(ASCP) & Bruce Palma MT(ASCP) - Mycobacteriology/Mycology Unit

**Last Issues Picture Quiz Answer:**



***Botrytis* Species**

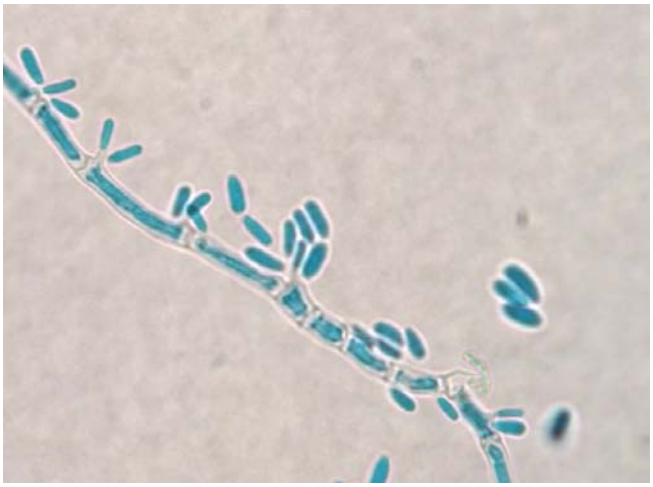
*Botrytis* species have worldwide distribution and are plant pathogens, commonly infecting ornamental plants, vegetables and fruits. They are frequently referred to as *Botrytis* blight or more commonly as "the grey mould" due to appearance on plant material. Infected plants have masses of grey spores on the dead or dying leaves, stems, flower buds, or bulbs. The most common species is *Botrytis cinerea*. This species is most notable for causing two types of infections in grapes. The first, called grey rot, results from wet or humid conditions resulting in the loss of grapes. The second type of grape infection caused by dry conditions following wet ones is typically called "noble rot." Noble rot is beneficial as it can result in sweet desert wines such as Sauternes. *B. cinerea* has been reported to cause infection in humans; a hypersensitivity pneumonitis called "winegrower's lung."

*Botrytis* colonies are hyaline at first becoming grey or brown with age. Colonies become powdery due to the large masses of spores. Microscopically, conidiophores are erect, brown and branching, and produce terminal swollen ampulae (sporogenous cells). Conidia arise simultaneously on each ampulla formed on short denticles. Conidia are globose to ovoid and may be hyaline or dematiaceous. Large black sclerotia are frequently formed.

References:

1. Barron, George. 1977. *The Genera of Hyphomycetes from Soil*. Robert E. Krieger Publishing Company, Huntington, N.Y.
2. *Botrytis Blight*, http://plantclinic.cornell.edu/factsheets/botrytis/botrytis_blight.htm
3. *Botrytis cinerea*, http://en.wikipedia.org/wiki/botyrtis_cinerea
4. Domsch, K.H., Gams, W., Anderson, Traute-Heidi. 1993. *Compendium of Soil Fungi*. IHW-Verlag, Germany.

**Picture Quiz: What Mould is this?**



## Chemical Exercise Tests Laboratory Capability

Marty Boehme MT(ASCP)
Division of Chemistry and Toxicology

Imagine that a hospital laboratory received a call from the emergency department (ED) asking for confirmation of potential organophosphate pesticides and/or nerve agent exposure. Would the hospital laboratory staff know how to respond?

On the morning of June 3, 2008, laboratory staff at three Michigan hospitals received simulated calls informing of ED patients presenting with symptoms including gastrointestinal distress, excessive urination, headache, vomiting and dyspnea. The labs were asked to send specimens for testing for pesticide and/or nerve agent exposure.

The MDCH laboratory has conducted several internal drills (See *LabLink*, Vol.13 No2, Spring 2008) to test the MDCH laboratory's capability to package, transport, and test clinical specimens during a chemical event. This event was the first to involve hospital partners in the Chemical Laboratory Response Network (LRN-C) and was part of a large Environmental Protection Agency (EPA) drinking water exercise, involving the six states in the EPA Region V.

The Centers for Disease Control and Prevention (CDC) played a significant role by shipping frozen spiked urine samples to each of the three hospitals. The laboratory staff re-packaged the samples using chain-of-custody procedures and arranged for transport to Lansing according to dangerous goods regulations.

The exercise provided a great opportunity for hands-on practice. All three hospital laboratories had access to materials provided by MDCH in earlier trainings, and packaged the specimens correctly. The transport system worked very well despite a few challenges. MDCH, one of ten Level-1 Response laboratories, tested and reported the results for nerve agent metabolites within 24 hours. CDC evaluated the reports and deemed them in agreement with expected results: two "patients" showed evidence of exposure.

In the fictitious scenario, all "patients" had consumed bottled water from a large out of state festival. The water had been deliberately contaminated and was then distributed by a vendor with questionable ties to extremist groups.

As in all exercises, areas for improvement were identified. Michigan's expansive geography presents challenges to rapid transport of frozen specimens. The availability of dry ice was recognized as a problem.

This exercise helped the participating hospitals fulfill one of the Joint Commission accreditation requirements. Thanks to the laboratory staff at Schoolcraft Memorial Hospital in Manistique, Oakwood Hospital in Dearborn, and Eaton Rapids Medical Center in Eaton Rapids for their participation. Thanks also to the MDCH Chemical Terrorism and Emergencies Section in the Bureau of Epidemiology for help in planning and conducting this exercise.

If your hospital laboratory would like to sign up for training, or wishes to participate in future exercises, please contact Marty Boehme, Chemical Laboratory Response Training Coordinator, at 517-335-9654 or boehme@michigan.gov.

### Bureau of Laboratories Vision

The Bureau of Laboratories is a stronger, more diverse team within an integrated public health system. We utilize advanced technology and innovative leadership to provide comprehensive public health services in our dynamic global community.

### Bureau of Laboratories Mission

We are dedicated to continuing leadership in providing quality laboratory science for healthier people and communities through partnerships, communication and technical innovation.

# Theory and Practice of Headspace Analysis

Mike O'Keefe, B.S.
Analytical Chemistry Section

The following is a synopsis of a training session sponsored by CDC and the APHL National Laboratory Training Network.

Headspace is the vapor layer above a sample in a closed vial. When opening a bottle of perfume, the odor is the air above the perfume. Headspace analysis demonstrates that the vapor above a sample contains some of that sample. The volatile components of the sample form an equilibrium between the sample and the vapor. The amount of volatiles in the sample and the vapor are directly related. Therefore, by determining the content and quantity of volatile compounds in the vapor, the concentration of volatiles in the sample can be determined. First, the vapor from a series of samples with known concentration of the chemical of interest is injected into a gas chromatograph (GC) to establish the calibration curve. Then the vapor from the sample vial is injected and the concentrations determined.

Headspace analysis can be accomplished in the following ways.

1) A portion of the headspace can be drawn into a gas-tight syringe then injected directly into the GC. Condensing the volatiles on a chilled inlet allows a larger sample to be introduced into the GC without spreading out the analytes. The inlet is then heated rapidly to release all the volatiles into the GC in a tight band. This method is called Cryo-focusing and is used by the MDCH laboratory to determine Volatile Organic Compounds (VOCs) in whole blood.
2) Alternately, the entire headspace in the vial can be flushed (using an inert gas) into the inlet of the GC and the volatiles trapped by the chilled inlet. This Purge-and-Trap method requires a specialized sampler to flush and sample simultaneously.
3) An adsorbent fiber can be inserted into the vial for a period of time to adsorb the volatiles, and then the fiber is introduced into the GC inlet, which again is rapidly heated to release the volatiles. This last technique is called Solid Phase Micro-Extraction (SPME) and is used in the MDCH laboratory to determine Cyanide in whole blood.

Some advantages of headspace analysis are:

1. Ease of injecting gas into a gas chromatograph.
2. Cleanliness; none of the matrix enters the GC so no build-up of residue.
3. Speed; the thawed sample is placed in the vial along with matrix
4. modifiers if needed, the vial is capped and its ready to go.

Closed Vial with sample and headspace

Some disadvantages of headspace analysis are:

1. Loss of analytes; every second the sample is open to the air, volatiles are lost.
2. Matrix affect; the matrix may have an affinity for the analyte, preventing it from entering the vapor phase.
3. Limited use; headspace analysis works for volatiles and semi-volatiles only.

However, there is a novel technique, being studied for characterizing non-volatile solids, including aspirin formulations and concrete. By exposing a mixture of twenty volatiles with different functional groups to the powdered solid, the matrix affect of the material is characterized by measuring the loss (if any) of each of the individual volatiles. The bar graph plot of the twenty analytes is called the Molecular Affinity Spectrum (MAS) of the material. The MAS of a sample can be matched to the MAS of a suspect material or compared to a library of known materials. In the future, this technique may prove useful in the determination of the content of "unknown white powder" samples.